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# Automated Transfer Vehicle (ATV-2) Mission Status



03/29/11

Space Mission Manager



# Agenda



- **Mission Review**
- **Support Overview**
- **Lessons Learned Part 1**





# Mission Overview

- **Visiting Vehicle:** Automated Transfer Vehicle (ATV-2) “Johannes Kepler”
- **Launch Date/Time:** 02/16/11 DOY 047/2150:55Z
- **Launch Vehicle:** Ariane-5 from Kourou, French Guiana
- **Inclination:** 51.6 degrees
- **Dock:** 02/24/11
- **Undocking:** 06/04/11



# Mission Review – Space Network



- **Launch attempt: 02/15/11**
  - Supported L-9 hours through scrub at 046/2210z
- **Launch Attempt: 02/16/11**
  - Supported L-9 (DOY 047/1300) thru Rendezvous Ops (DOY 055/1559Z)
- **SN mission total events: DOY 047 – 080: 774**
- **Service Total up to DOY 080: 888 hrs 04 minutes**

• SSAF	SSAR	SMAF	SMAR	MAF	MAR
• 58:59	58:59	129:39	130:05	254:15	256:07



## Mission Review – Space Network (cont'd)



- **SMA / MA 64kbps (HDR) Engineering Successfully Supported**
- **RFICD will be updated based on SMA and MA HDR results and acceptance of service by ATV**





# ATV-2 Mission TDRSS Overview



ATV-2 TDRSS Mission Totals

(DOY)	Daily Events	TDE (F-10)					TDS (F-4)					171 (F-5)					TDW (F-6)					275 (F-7)					
		Events	SSAF	SSAR	MAF	MAR	Events	SSAF	SSAR	MAF	MAR	Events	SSAF	SSAR	MAF	MAR	Events	SSAF	SSAR	MAF	MAR	Events	SSAF	SSAR	MAF	MAR	
12	0																										
47	3	1	35	35	0	0											1	50	50			1	28	28			
48	60	24	297	297	212	212						1	20	20			17	276	276	178	178	18	125	125	268	268	
49	75	27	98	98	340	340	1				30	30	2	40	40			27	60	60	373	384	18			384	384
50	74	15			473	473	1				28	28	2	40	40			32	243	243	206	206	24	51	51	350	350
51	79	21	100	100	360	360	2				12	12	1	20	20			31	145	145	311	326	24	59	59	335	335
52	78	37	242	242	260	270	1				6	6						23	88	88	470	470	17	12	12	298	298
53	85	27	52	52	438	438	2				8	8	3	46	46			32	149	149	356	367	21	60	60	257	277
54	72	28	100	100	396	396	1				23	23						28	170	170	381	381	15	35	35	305	305
55	57	16	207	207	232	232	4	60	60	20	20	7	197	197			14	137	137	194	194	16	254	254	121	124	
56	45	11	22	22	284	284	5			122	122	1	21	21			14			422	422	14			403	403	
57	18	3			87	87	2				33	33						7			154	154	6			152	152
58	38	13			421	421	2				56	56						14			418	418	9			216	216
59	47	13			448	448	3				77	77						16			515	515	15			362	362
60	43	13			377	377	4				119	119						15			512	512	11			237	237
61	42	13			443	443	3				99	99						14			493	493	12			273	273
62	43	14			500	500	2				52	52						15			520	520	12			274	274
63	43	13			466	466	1				31	31						14			487	487	15			370	370
64	46	11			338	338	6				185	185						17			474	474	12			275	275
65	44	14			431	431	3				67	67						14			416	416	13			332	332
66	28	9			193	193	2				51	51						7			197	197	10			244	244
67	11	7			140	140												3			60	60	1			20	20
68	5	5			100	100																					
69	6	1			20	20												3			60	60	2			40	40
70	15	4			100	100												8			139	164	3			74	74
71	7	5			100	100												1			20	20	1			20	20
72	8	1			26	26												5			118	118	2			20	37
73	6	3			60	60												3			60	60					
74	5	4			80	80	1				20	20															
75	9	3			58	58												4			117	117	2			25	25
76	7																	6			120	120	1			20	20
77	36	11			276	292												13			370	370	12			229	239
78	5																	5			111	111					
79	5	4			80	80												1			20	20					
80	4	2			40	40												2			40	40					
Totals =>	774	373	19:13	19:13	129:39	130:05	46	1:00	1:00	17:19	17:19	17	6:24	6:24	0:00	0:00	406	21:58	21:58	138:32	139:34	307	10:24	10:24	98:24	99:14	

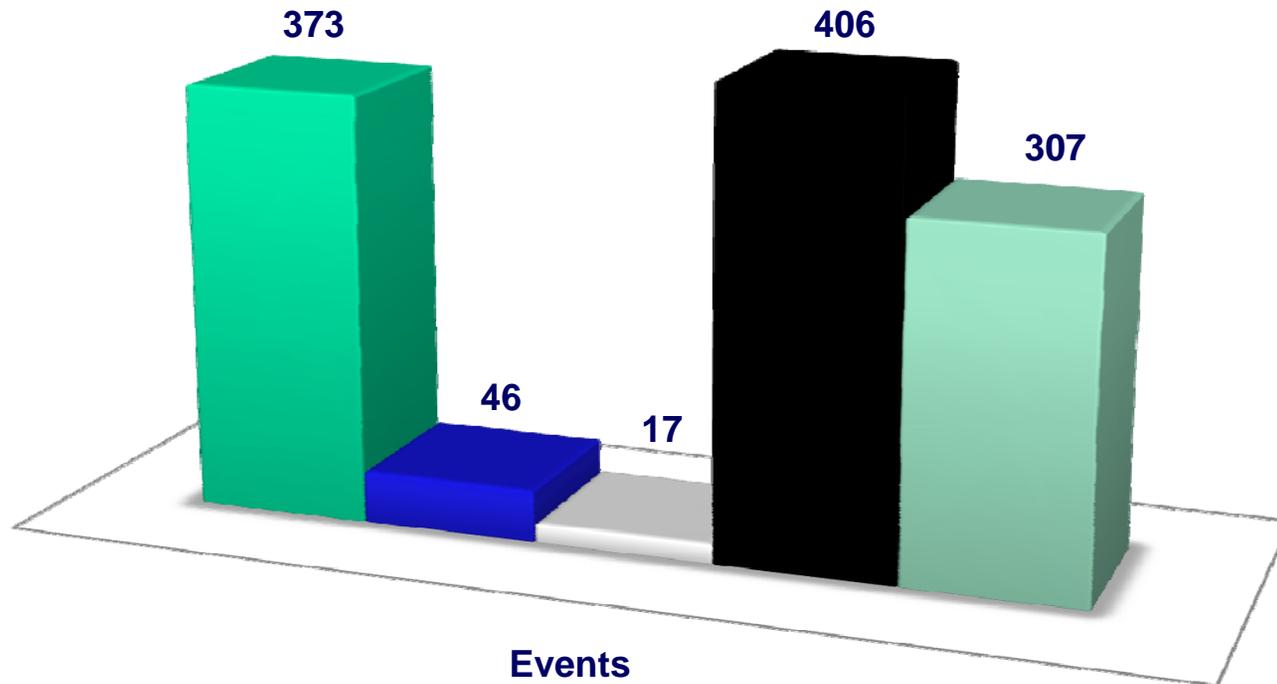


# ATV-2 Mission TDRSS Overview (cont'd)



## ATV-2 Events per TDRS from Prelaunch to DOY 080

■ TDE (F-10) ■ TDS (F-4) ■ 171 (F-5) ■ TDW (F-6) ■ 275 (F-7)

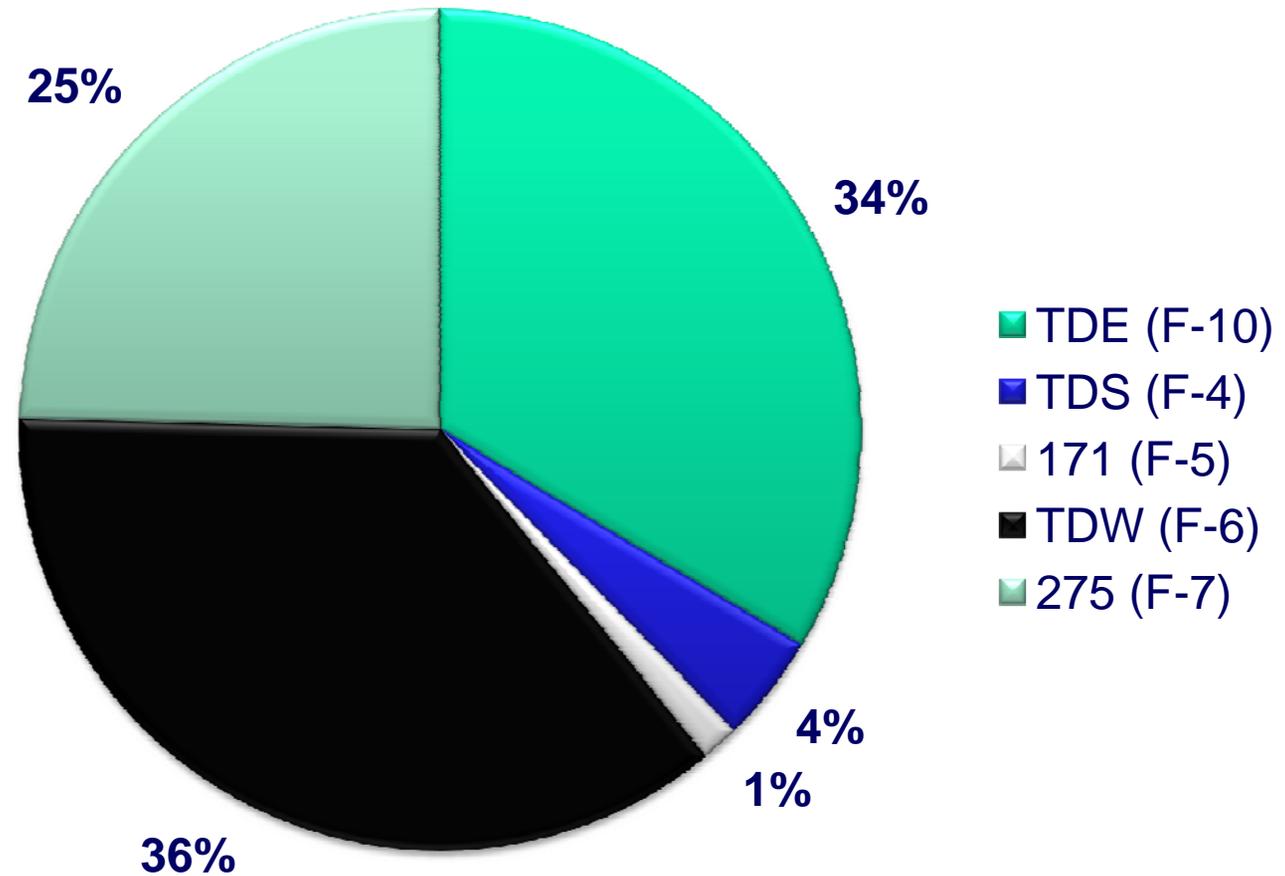




# ATV-2 Mission TDRSS Overview (cont'd)



## Usage Pre-Launch Through DOY 080

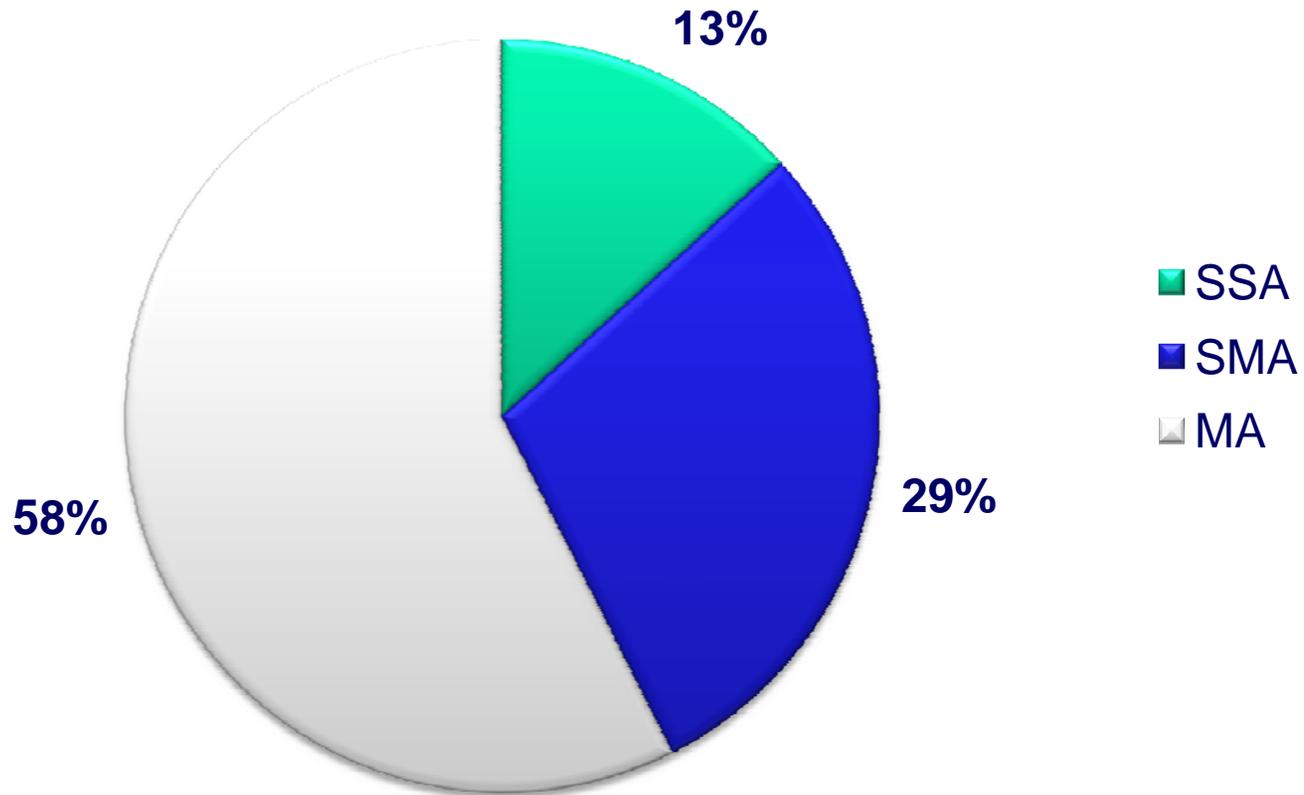




# ATV-2 Mission TDRSS Overview (cont'd)



## Service Usage Pre-Launch Through Docking





# Critical Periods to Date



	Event	GMT Start		GMT End	
		DOY	HH:MM:SS	DOY	HH:MM:SS
1	ATV Launch and Early Orbit Period (LEOP)	47	22:38:55	48	9:14:55
2	ATV Maneuvers	50	16:21:55	50	19:36:55
3	MC2 Maneuver	53	11:48:00	53	15:03:00
4	TV1 Maneuver	54	11:56:00	54	16:42:00
5	TV2 Maneuver	54	19:29:00	55	0:16:00
6	TV3 Maneuver	55	3:04:00	55	21:49:00
7	Docking	55	15:45:55	55	15:45:55
8	ATV-2 Super Critical Period 1	55	11:17:24	55	11:43:54
9	ATV-2 Super Critical Period 2	55	13:02:00	55	13:13:11
10	ATV-2 Super Critical Period 3	55	14:43:30	55	14:49:12
11	ATV-2 Super Critical Period 4	55	16:21:07	55	16:25:27
12	ATV Buffer Dump, OSC Test, ATV Reconfiguration	56	6:20:55	56	13:05:27
13	Buffer Dump, ISS Reboost, and ATV Reconfig	75	1:00:00	75	7:05:00
14	ATV Buffer Dump	77	1:59:55	77	2:20:55
15	ATV Prep, ISS Attitude Control and ATV Reconfig	77	2:20:55	77	12:40:55
16	ATV Housekeeping - Cancelled	78	8:44:55	78	10:44:55
17	ATV Prep, ISS Attitude Control and ATV Reconfig	79	1:14:55	79	7:59:55
18	ATV Refueling Operation - RFS Leak Check	81	0:30:55	81	8:06:55
19	ATV Thruster test - ATV Buffer Dump/RFS leak check	88	21:10:55	89	1:59:55
20	ATV propulsive support for Thruster test	98	12:17:55	98	12:37:55



# WSC Requested Services



- **White Sands Complex (WSC) has held data as requested**
- **WSC has provided RF performance data requested**





# SN Discrepancy Reports



CDS Number	Description	Impact/Resolution
60901	SGLT-6/TDRS-7 - ATV-2 MA Return No Lock	Event did not lock. JSC advised that they were not expecting to achieve lock. Problem closed
60902	SGLT-6/TDRS-7 - ATV-2 Late Acquisition	<ul style="list-style-type: none"> <li>•64 kbps GCMR at 11:21:38, lock</li> <li>•Dropped lock at 11:22:08</li> <li>•GCMR sent at 11:22:38</li> <li>•Both receivers had PN lock and carrier lock but no decoder lock</li> <li>•8 kbps GCMR at 11:24:43 to reconfigure for 8K</li> <li>• Lock was achieved at 11:24:49</li> </ul>
60909	TDRS 7 SGLT 6 ATV dropout	TDRS telemetry perturbation caused dropout in MA ATV event
61010	TDRS-10 / SGLT-4 ATV MAR2 Lock Loss	<p>ATV lost lock on MAR2. Chain configuration: MAF-B, MAR2 @12:58            ATV experienced a drop-out on MAR2. Eb/No's were below nominal threshold and a second MAR5 spun-up as hot standby.</p> <p>Both chains saw s low Eb/No's and low RF on the spectrum analyzer. @13:04 ATV switched to their alternate Artemis platform.            @13:11 ATV returned to the TDRS platform with solid lock. ATV stated there were no configuration changes during the SHO</p> <p>There was no predicted MI</p>



# SN Discrepancy Reports (cont'd)



CDS Number	Description	Impact/Resolution
61012	TDRS 10 / SGLT 4 ATV Loss of lock on MAR 3	<p>TDRS 10 / SGLT 4 ATV Loss of lock on MAR 3</p> <p>ATV reported loss of signal at 14:31:13, ATV was asked if they would like a manual chain failover and it was performed at 14:35:18 from MAR3 to MAR2 and still no lock. ATV switched over to Artemis at 14:38:37. At 14:47:00 ATV relocked on the Signal from TDRS and CSC4 saw the same as of 14:47:08 on MAR2. ATV reported that had switched over to TDRS as a data source at 14:52:00</p>
61015	TDRS 10 / SGLT 4 ATV Loss of lock on MAR 4	<p>TDRS 10 / SGLT 4 ATV Loss of lock on MAR 4</p> <p>ATV lost lock on MAR4 at 16:06::49. MAR5 came up as the spin up chain and also did not lock</p> <p>At 16:12:39 ATV sent in a Return Reacquisition and still no lock</p> <p>A manual chain failover was performed by CSC4 at 16:18:04 and reassigned from MAR4 to MAR3 and still no lock. ATV reported lock at 16:21:49</p>
61017	TDRS 10 / SGLT 4 ATV Loss of lock on MAR 4	<p>TDRS 10 / SGLT 4 ATV Loss of lock on MAR 4</p> <p>Mar4 lost lock at 17:47:12, spin up chain MAR1 came up and also did not lock, no failover occurred</p> <p>MAR4 locked back up at 17:54:13. ATV notified that they would be going over to Artemis at 64K so we will be losing lock when that happens. At 17:59:34 MAR4 lost lock as expected, ATV using Artemis to pass data</p>



# Mission Review



- **FDF**

- **Provided pre-mission analysis of C-band and TDRS coverage of ATV-2**
- **Provided Orbit Determination support using TDRS and/or C-band tracking data after insertion, prior to/after maneuvers, and daily during non-maneuver periods prior to berthing. FDF solution vectors were provided to ATV-CC via JSC**
- **Provided acquisition data support to C-band sites and the Space Network. Acquisition data based on ATV vectors received from ATV-CC via JSC or on FDF orbit determination solutions**
- **Provided TDRS vector support to the Johnson Space Center and ATV-CC**
- **Evaluated ATV tracking**
- **No problems**



## Mission Review (cont'd)



- **NISN**
  - Provided voice and data circuits
  - No problems reported
- **NIC**
  - SMMs were on console from launch L-9 hours through Rendezvous Ops
  - Provided assistance in conflict resolutions
  - No problems reported



# Mission Review



- **C-Band Radar Support: No problems reported**

Station	Orbit Number	DOY/Time
JDIQ	2	048/0057-0107z
MLAQ	3	048/0058-0107z
WLPQ	3	048/0101-0109z



# Lessons Learned

- **SN Forecast Scheduling**

- **Launch events scheduled in the Forecast period did not get scheduled with the requested times**
- **JSC submitted events with a minimum duration and tolerances**
  - **If exact time is not available then the Event automatically schedule based on tolerances and minimum durations**
  - **Does not reflect a conflict since it meets the requirements of the specified tolerance and minimum duration in the Event**
- **Forecast Scheduling has no way of knowing the event did not schedule as requested**



## Lessons Learned (cont'd)

- **ATV-2 RCAA 00794 – Reschedule due to Launch Scrub**
- **Problem Title: Late Scheduling of ATV-2 Critical Launch Event**
  - Launch on 02/15/11 scrubbed and was rescheduled for 02/16/11
- **Problem Statement:**
- **To understand the miscommunication between JSC, GSFC and WSC in filling the TDRS critical times for the ATV-2 mission post launch and early orbit phase**
- **Will be addressed during the SN Scheduling Splinter:**
  - **Wednesday, 03/30/11**
    - Regents Park, III, Room 212C
    - 3:00 pm



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# Open Discussion